Creating and collaborating: students' and tutors' perceptions of an online group project

International **R**eview of **R**esearch in **O**pen and **D**istributed **L**earning
Volume 19, Number 2

April – 2018

Creating and Collaborating: Students' and Tutors' Perceptions of an Online Group Project


Helen Donelan and **Karen Kear**
The Open University, United Kingdom

Abstract

Although collaboration skills are highly valued by employers, convincing students that collaborative learning activities are worthwhile, and ensuring that the experience is both useful and enjoyable, are significant challenges for educators. This paper addresses these challenges by exploring students' and tutors' experiences of a group project where part-time distance learners collaborate online to create a website. Focus groups were conducted with students who had recently completed the project, and discussion forums were used to gather feedback from tutors who supported students and marked their group work. The research showed that students' attitudes towards the group project on completion were generally favourable. Findings highlighted key aspects for successful online group projects and for motivating students to participate fully. These included: the design of authentic tasks, with skills development relevant to the workplace; careful attention to how the group work is assessed; and enabling students to develop websites they could be proud of. Frustrations for students were associated with the lack of engagement of fellow students and with limitations of the tool provided for building the website. Tutors found marking the work a time-consuming and complex process. Tutors were also unconvinced of the value and fairness of assessing students partly on a group, as opposed to an individual, basis.

Keywords: collaboration, online learning, group projects, authentic learning, assessment

Introduction

Educators and employers agree that the development of group working skills is a key aspect of higher education. Being able to work effectively with others is relevant to many areas of employment, so enabling students to develop these skills is crucial (Universities UK, 2016; UK Commission for Employment and Skills [CES], 2016). In addition, the advantages of collaborative learning activities are well recognized by educators (McConnell, 2006; Hrastinski, 2009). Collaboration is seen as a key part of social constructivist and situated learning approaches (Brown, Collins, & Duguid, 1989; Huang, 2002). It fits with ideas of learning as participation, where the learner becomes an active member of a community (Lave & Wenger, 1991; Sfard, 1998). As Brown et al. (1989) have pointed out, "if people are going to learn and work in conjunction with others, they must be given the situated opportunity to develop these skills."

However, students often do not understand why group work is important (Roberts & McInnerney, 2007), they may be reluctant to participate, and some even find the prospect daunting. Past studies have shown that students' negative perceptions of group work are affected by: challenges in communication, in particular handling difficult or absent group members (Ozturk & Hodgson, 2017); logistical decisions about leadership and timing of work (Allan & Lawless, 2003); and the dependence of their grades on other students (Payne, Monk-Turner, Smith, & Sumter, 2006; Myers, et al., 2009).

Successful group working can be particularly difficult to achieve in a distance or online learning setting. There are additional challenges for students in communicating and interacting with other team members whom they may not know in person. Distance learning students often expect that all their work will be done independently (Smith et al., 2011); they assume that they will be in control of how much they communicate with other students and of their own study schedules. This can result in resistance to participation in online group work. Group work activities should therefore be engaging, and the tasks should have real-world relevance so that students can understand the value of the work (Herrington, Reeves, & Oliver, 2010).

This paper reports research to investigate perceptions of an online group project in a module presented at the UK Open University where students collaborate online and produce a website. The work provides a valuable and unique contribution as it considers not only the views and experiences of students, but also of the tutors who support the students and mark their work. The research is aimed to discover which aspects of the group project worked well and which aspects were problematic, with a particular focus on how the group work is assessed. The research findings will help to inform online educators who aim to design group projects that are authentic, engaging and fairly assessed.

The research questions addressed in this paper are:

- What aspects of online group projects do students find enjoyable/motivating/rewarding?
- What aspects of online group projects do students find difficult/demotivating/frustrating?
- What are tutors' opinions on online group projects, and what are their biggest challenges?
- What are the key aspects for ensuring group projects are engaging to students and fairly assessed?

Background and Literature Review

The following discussion is organized around three key themes:

1. Collaboration — how students interact with each other;
2. Task — what students are required to do, and to produce; and
3. Assessment — how marks are allocated.

Collaboration

Collaborative technologies have advanced over the past couple of decades and have made a significant impact in higher education, and particularly in online learning. Educators now have a wide choice of tools that can facilitate online group interactions, and students are already familiar with interacting online for personal purposes. Higher education is exploiting these changes by incorporating online communication tools into both formal and informal learning activities (Donlan 2014; Kear et al., 2014; Selwyn, 2009; Tess, 2013).

Asynchronous tools, such as online discussion forums, enable students to communicate at any time that suits them; forums, in particular are a popular way of supporting online group work (Oliveira, Tinoca, & Pereira, 2011). Wikis support collaborative writing, as well as other aspects of online collaboration (Lin & Reigeluth, 2016). Synchronous tools, such as Web conferencing, that support real-time audio, video and text interactions can also be valuable (Kear et al., 2010; Thorpe & Edmunds, 2011). These can enable decisions to be made much more quickly than using forums; however, scheduling real-time online meetings is often problematic for students, particularly those studying part-time.

Several studies have explored the dynamics in online groups (for example, Brindley, Walti, & Blaschke, 2009; Smith et al. 2011) and proposed patterns of interaction that occur in successful online group work. For example, *negotiation, discussion*, *agreement*, *research*, *conception,* and *production* are examples of patterns experienced by harmonious or cohesive groups identified by McConnell (2006). Building on this, Oliveira et al. (2011) stressed the importance of groups negotiating the problem and their collective intent to harmonize. Conversely, patterns seen in less successful groups, included: *struggle*, *changing of minds*, and *change of direction* (McConnell, 2005).

These studies also identify the importance of the sequencing of different stages of work, such as negotiation, discussion, and production, and the time spent on each of these. Timing is a crucial factor in any type of group work (McGrath, 1990); however with online groups, timings become more complicated. When groups are working to assessment deadlines, and members are relying on each other to complete interdependent tasks, uncertainty about when tasks will be completed can be a significant source of frustration (Allan & Lawless, 2003).

Task

Group projects generally require members to work together to create a final output or product. In an online learning setting, where building something physical is impractical, the output of group work typically takes the form of a report or wiki page, or a digital artefact, such as a website. Brindley et al. (2009) make a number of recommendations for designing successful group projects, and many of these relate to the task: clarify expectations and instructions for the task; choose a task which is best performed by a group; allow enough time for the task and the necessary collaboration; and achieve a

balance between structure and autonomy for students. In addition, the task should be relevant to real-life, and to the students' education and work context(s) (Thorpe & Edmunds, 2011).

Other authors have also focussed on ensuring that tasks are authentic (Amory, 2014). Herrington et al. (2010) state that tasks should have real-world relevance, require students to identify their own approaches, be complex (and therefore sustained over a period of time), and provide the opportunity to collaborate and reflect. Lombardi (2007) points out that students are motivated by solving real-world problems, and that learning activities should "match the real-world tasks of professionals in practice as nearly as possible." Such authentic approaches to learning highlight the importance of multiple perspectives, collaboration, reflection, integrated assessment, and creation of *polished products*. Authentic learning activities should support skills in analysing, evaluating, and creating.

Assessment

Assessment is a particularly sensitive issue in group work; one of the reasons students are often unwilling to participate in group projects is that the marks they achieve can be dependent on other students (Payne et al., 2006). It is therefore important to "analyze multiple forms of evidence to measure student performance, including observations of student engagement and artifacts produced in the process of completing tasks" (Lombardi, 2007).

A major consideration in the assessment of group work is whether students will be awarded marks individually or as a group. Roberts and McInnerny (2007) claim that assigning group grades—without distinguishing between individual members of the group—is unfair and should not be used. Strauss et al. (2014) highlight the specific challenges in assessing group work, and make the point that awarding individual marks to group members depending on their contributions can be very difficult to implement. It can also be perceived by some as unfair, especially when the group is made up of a diverse body of students. Webb (1995) identified undesirable group processes, such as social loafing, absent group members and controversy and conflict within a group, which can adversely influence the outcomes of group assessment.

Another aspect to consider in assessing group work is whether both the product and the collaborative process will be assessed. If the quality of the group product is a main focus, then the group output should be assessed (Webb, 1995). However, if the learning outcomes also relate to students' group working skills, then methods must be found for assessing the quality of the collaboration (Naismith, Leet, & Pilkington, 2011).

A benefit of an online group project, compared to a face-to-face one, is that when students are using online tools to collaborate there is typically a record of the interactions taking place. It is possible to observe the details of discussions, who initiated ideas, how decisions were made, and the timings of completed tasks - even after the project has ended. This enables the collaboration to be assessed.

The Module Context

The context for the research presented in this paper is a Level 2 undergraduate module called *Information and Communication Technologies,* presented by the UK Open University. This is a successful module that has run since 2010 with between 400 and 700 students per year. It incorporates a group project that has been progressively adapted over the three preceding modules. Retention figures since the module began suggest that the dropout rate is not significantly affected by the inclusion of the

group project (retention figures are significantly higher than other Level 2 modules in the same program). In two out of the six years that the module has run, however, the steepest drop-off in assignment submissions is for the group project.

The module is studied over a period of 31 weeks and students are required to work in groups of between five and eight students starting at around week seven. Students are placed into groups by their tutor, where each tutor typically has enough students to form between three and five groups. Tutors support students throughout the whole module and also mark their assignments. By the time students reach the group work they will have had: one-to-one contact with their tutor, either via email, discussion forums, or phone; received feedback on their first assignment; and had the opportunity to attend a face-to-face or online tutorial (although the majority of students choose not to attend tutorials).

Most of the group work occurs in weeks 11 to 16. The tutors' role during the group work period is much more hands-off than is other parts of the module. Once students are in groups, the students are expected to discuss their approach to the tasks and solve any problems within their group without tutor input. Tutors are, however, still available during this period and they do get involved if a group is struggling.

The assessment requires student groups to produce a wiki resource and a website. The work students undertake with the wiki has been researched previously (Kear et al., 2014). The current paper focuses on the website development, which is a more technically challenging task. Students are required to work with a software tool—WordPress—that is widely used for developing websites. Students need to include a number of prescribed technical features, as well as producing the content for the website. They therefore gain website development skills appropriate in the context of an IT module and with real-world relevance.

Groups are given a specific "client" in order to make the task authentic. Examples have included a walking club, a canal boat holiday company, and a community theatre. How the group organizes themselves, for example whether they have a group leader and how they make decisions, is left to the group to decide. Groups are provided with a number of online tools: WordPress to carry out the Web development; a forum to facilitate group discussion; and a wiki for documenting the decisions made by the group. Some groups choose to use other tools in addition to these. The WordPress software provided to students is a cut-down version hosted internally for the module. Using this restricted version allows all students to develop their technical skills, whilst ensuring that students with no previous experience with the software can cope with the fundamental technical requirements. Students are asked to include various items, for example a calendar and a map, but the *plugins* that enable these to be embedded are provided and have been thoroughly tested. Students are restricted to the plugins provided and cannot import new ones. They are told what type of content they should include, but they have the freedom to be creative and include images and content of their choosing.

A key learning outcome of the module is to "work effectively as part of a group in a distance setting where collaboration is undertaken via computer-mediated communication." This means that the process of collaboration, as well as the final product, should be assessed. The marks are split evenly between the product—the final website—and the collaboration process. In addition, marks are split between individual marks—allocated for a student's own contributions to both the product and the collaboration process—and group marks—marks that group members receive equally. As groups are required to collaborate to produce a shared product, the group marks are intended to motivate students and reward these aspects. Students are informed that only contributing group members will be awarded

the group marks; the assignment guide says: "Any group member who makes no contribution, a negligible contribution, or whose contribution is too late to be useful will not be awarded any [group] marks." The proportion of marks allocated to each of these elements is illustrated in Table 1.

Table 1

Proportion of Marks Allocated to Product and Process and on a Group and Individual Basis

	Marks for product (website)	Marks for process (collaboration)
Individual marks	30	30
Group marks	20	20

Evidence from end-of-module surveys and from previous research (Kear et al., 2014) suggests that, once students have taken part in the group work on this module, they recognize the value and many of them enjoy the experience. However, a small number of students still opt out altogether and some contribute very little.

Method

Data Gathering From Students

Because the research gathered feedback from students studying the module, permission was needed from the Open University's Student Research Project Panel, which is responsible for approving research involving Open University students. Once approval was received, invitations to take part were sent to 400 students. The invitation email explained the purpose of the research and clearly stated that students' contributions would be anonymous and would not affect any other aspect of their study.

Twenty-eight students responded. Whilst this was a low response rate (7%) it was not felt to be unusually low in a distance learning context, where most students are in full-time employment. Students were being asked to participate in focus groups and contribute a significant amount of their time. This is in contrast to online surveys, which take less time and can be completed when convenient to the student.

Students were consulted as to their availability and divided into six online focus groups. Twenty-five students subsequently took part in the focus groups with attendance ranging from two to six participants in each group. Three responded to the questions by email, as they were unable to attend at the times when the focus groups were eventually scheduled. The focus groups (and email responses) all took place in the month after students had completed the group work. They were held using the Open University's audio-visual conferencing system, OULive (a version of Blackboard Collaborate), with which students were familiar from their studies.

The students attending a given focus group were not from the same project group and did not know each other beforehand. One member of the research team, who was an experienced facilitator of online synchronous sessions, led all six focus groups. Each focus group lasted between 30 and 45 minutes. The

focus groups were recorded using the recording facility provided within OULive. No video was used, as experience has shown that Open University students tend to prefer audio and text chat interaction.

A number of open-ended questions were used to structure the focus groups; however, students were encouraged to talk about whatever aspects they felt were important.

The questions used were:

- Did you enjoy the group project?
- Did you find it rewarding?
- What do you think was your group's biggest challenge?
- Did you find any particular aspect frustrating?
- Did it go better or worse than you expected?
- Do you feel the marks for this assignment fairly reflected *your* contribution and the group's overall?
- How did your group go about negotiating tasks and responsibilities?
- Do you feel that the technical tasks were fairly divided among group members?
- Do you feel that organisational responsibilities were fairly divided among group members?

Coding of Student Data

Transcripts were made of the audio from all six focus groups in order to facilitate the analysis of the data. Additional data that were analysed were: chat transcripts from three focus groups (when students used this facility); and individual email responses from the three students who did not take part in focus groups.

A thematic analysis approach was adopted (Bryman, 2015). In the first stage of analysis, three researchers (all current or former members of the module teaching team) independently coded the text from one of the focus groups to identify emergent themes. The researchers then met to compare the results of this process, identifying where there were differences and where there was agreement on the text extracts used and the codes/themes that had been allocated. From this initial discussion, a draft set of codes and subcodes that represented the aspects of interest from the data were agreed upon. The researchers then independently coded a second focus group, again meeting subsequently to discuss differences and agreements. From this discussion a revised version of the coding set was produced, which involved omitting, adding, and merging codes. Using this final coding set (see Figure 1, below), one of the researchers then coded all the student data.

Data Gathering From Tutors

The experiences and perceptions of tutors were gathered through a discussion forum. This was a forum that tutors used to discuss the module, and through which they were therefore used to engaging with one another and with the module team. The purpose of the research was explained to tutors and two

discussion threads were set up. One thread asked questions relating to tutors' views of their students' experiences of the group work:

- Do students enjoy the group project? Do they find it rewarding?
- What do you think are their biggest challenges? What do they find particularly frustrating?
- How do groups go about negotiating tasks and responsibilities?
- Do you feel that the tasks and responsibilities are fairly divided among group members?

A second thread asked questions about tutors' own experiences of supporting students and marking the group project:

- What is your experience of supporting and marking the group project?
- Do you feel that students' marks fairly reflect their individual contributions and how well each group performed overall?
- Do you think that the group project is a valuable experience for students?

Ten tutors (out of a total of 27) responded. Responses varied in their level of detail: two tutors provided brief, bullet point answers and the remaining tutors provided full, reflective accounts.

Coding of Tutor Data

The tutor data was coded using the codes and subcodes established during the analysis of the student data, with two new subcodes added under the *TUTORS* code (see Figure 1, below).

Results

In total, 10 main codes were agreed upon through the process described earlier. Each of these codes (black text in Figure 1) had a number of subcodes (white text in Figure 1). Each code also had an *other* subcode to include comments that could not be classified under any of the existing subcodes but that provided useful insight.

Some codes had more text extracts associated with them than others, and some extracts were assigned more than one code/subcode. For example, a comment about the challenge of dealing with absent group members could be encoded *FEELINGS—Challenge* and *PARTICIPATION—Absent*.

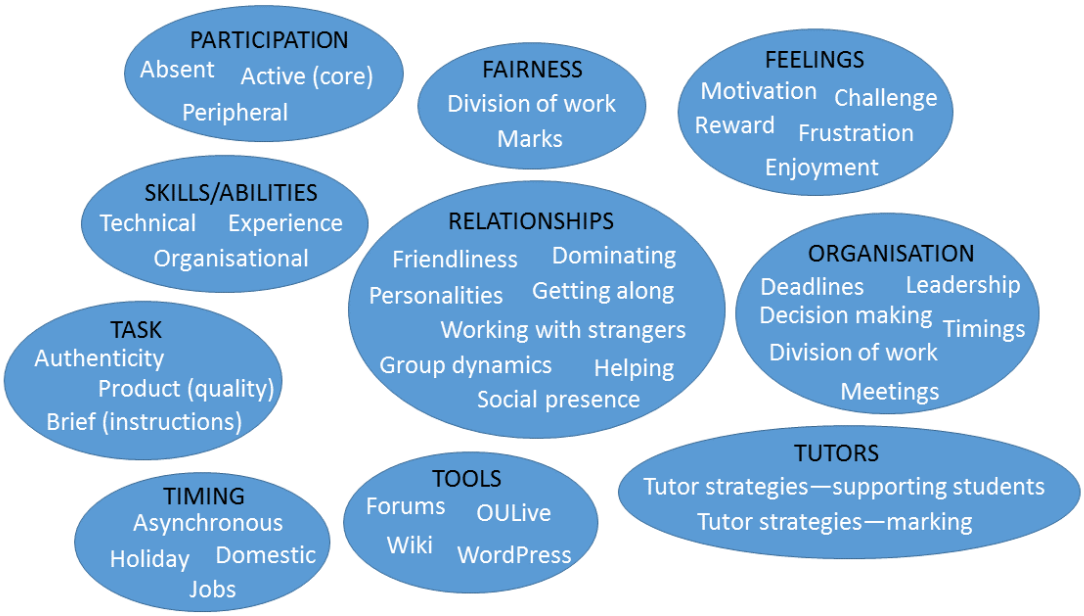

Figure 1. Codes and subcodes used for student and tutor data.

(Note: the sizes of the ovals do not reflect the number of comments received, or any measure of importance.)

In the subsequent analysis of the student data, it was helpful to look at the balance of negative and positive comments for some subcodes to get a sense of how students felt about certain aspects. In other cases, it was more appropriate to identify the key points that students were making around a particular subcode. The same approach was subsequently used for the analysis of the tutor data to identify where there were agreements, and where there were differences between student and tutor perceptions.

Broadly speaking, students who took part in the research were positive about the group project. When asked whether they enjoyed the project, the majority said they did. Twenty-four of the comments (coming from 17 students) that were coded FEELINGS—*Enjoyment* were positive; 6 comments (from 5 students) were negative. Comments relating to *Enjoyment* and *Reward* were split fairly evenly between comments that referred to the collaboration process and to the website development task. Interestingly, almost all the comments that related to *Challenge* were about the collaboration, whereas most of the comments about *Frustration* were about the task. These findings will now be explored in more detail using the key themes of collaboration, task, and assessment, as introduced earlier.

Collaboration

There were more positive than negative comments about whether the collaboration was an enjoyable experience. Nine out of the 27 students explicitly said they enjoyed the collaboration processes involved in the group project, whereas four students explicitly said that they didn't. (The remaining 14 did not comment directly about this.)

Several of the specific responses, and interpretations of these responses, follow: "So I sort of went into this thinking, "Ah this is going to be terrible," but it was actually a really positive experience for me [...]."

The positive points raised by students about the collaboration included: it was enjoyable interacting with other students; it was nice not to feel isolated; it was fun; it was enjoyable to share knowledge and get feedback; and that there was some real-world relevance to working in this way—as part of a team: "It was lovely that the collaboration actually worked and its sort of part of the modern world, collaborative work, and think it was a very good lesson to learn."

For those students who did not find the collaboration an enjoyable experience most comments indicated that there were problems with relationships within the group: "From a personal experience I enjoyed using the WordPress site. However, we had major issues with our group that meant, no, it wasn't rewarding or enjoyable.

Tutors agreed that most students enjoyed the group project, and one tutor identified a correlation between the level of engagement and how much students enjoyed it: "For those that engage, I think most enjoy the work. For those who don't engage, this is a chore."

When students were asked what they felt the biggest challenges were, the vast majority of comments referred to the collaboration aspect of the project rather than to the Web development task. For example, they experienced challenges in: working with strangers; ensuring everyone met deadlines and issues around timings in general; getting started, but also maintaining momentum; and dealing with absent members and personality clashes. Whilst these are not unexpected issues to arise in group work, there was a noticeable lack of comments about the challenge of the task itself. This is surprising given that students had been asked to demonstrate a significant level of technical competence with a new piece of software, and with minimal instruction on how to use it. The collaboration was also a focus of tutor discussions; almost all the tutor comments about the major challenges students faced were associated with getting other group members to cooperate, contribute, and meet deadlines.

Despite the challenges, students also talked about the collaboration process being rewarding. There were comments from several students that showed they had benefited from the experience: "It was interesting and in some ways it's developed us because I hadn't really worked in a group before that and so it kind of gave another aspect on studying."

Again, these sentiments were supported by tutors who felt that, whilst there were always some students who were glad to get it out of the way, most found it a rewarding and valuable experience.

Tutors also expressed feelings of challenge and reward with respect to their own experiences in supporting students through the collaborative project. Tutors expressed concern about groups that were slow to get going, and talked about the struggle of supporting some students, such as those with rigid time constraints or those who found communicating difficult.

Despite the overall positive experiences, students also discussed the problems they had encountered during the collaborative project. There were problems with group members who were absent, either from the beginning of the project or part way through. In most cases, though, there was an active core of two or more group members who were able to continue with the work. Dominant personalities were discussed as a problem by several students, and examples were given in which different team members were pulling in different directions.

A few students expressed anxiety about the group work. One student commented that this could have been the reason for one group member's lack of participation: "We had one group member who didn't

take part a great deal but, again, with all the dominant personalities that were there it was like she was scared to speak up."

A final observation from a student regarding the collaboration was that group members tended to work individually on separate Web pages rather than collaboratively across all pages: "It just didn't feel like we were building a website together. I felt we were still building a group of pages."

Task

An interesting finding regarding the task was that students wanted to feel proud of their final product. Students' and tutors' comments showed that students felt proud of what they achieved: "We did get it done and it looked really remarkable in the end." (Student comment) and "I have no doubt that students find the learning experience rewarding and tend to be very proud of their end artefact" (Tutor comment).

Students suggested that final products be made visible to all students on the module: "I would have liked to have seen all of the groups' pages just to get a feel at the end for how we did and compare that to other groups whose sites we hadn't seen."

However, some expressed disappointment with their group's final product, and would have liked more emphasis on quality of graphic design. Others commented that they felt restricted or frustrated regarding the content they were able to include in the website. The version of WordPress used was referred to as being too "cut down" or "limited." In fact, of the 28 student extracts that were coded *Frustration*, 16 of these referred directly to WordPress and the features that had been made available for them to use: "Because it was a cut down version we ended up quite frustrated in that we couldn't actually make the site look as nice as we wanted."

Some of the comments received from students who had prior website development experience related to the apparent lack of authenticity of the task set, such as: "adding a Twitter feed onto the page. Adding, you know, Facebook interaction because that's what [...] a business would do."

Tutors agreed that the more technically-experienced students tended to complain more about the tools and limited functionality available to them. The less technical students had the opportunity to learn new skills, and generally found the task itself more rewarding. Tutors also reflected that the more technically-confident students took on more of the technical tasks, though sometimes not by choice. Although the authenticity of the task was questioned by some students in terms of the technical functionality of the tools, this was not highlighted as a concern by tutors. In general, they considered the task to be a useful exercise for students, and one that developed real-world relevant skills. However, it is clear that reducing the flexibility of the task and tools had a negative effect on some students' motivation, even though it was helpful for other students. This balance needs careful thought in the future design of group projects.

Assessment

Comments regarding the division of work amongst group members provide an insight into how fair students felt the project was. There was an even balance between positive (14 comments from 10 students) and negative (13 comments from 9 students) comments relating to how fairly the work was divided between group members. While there was little expansion on the positive comments, an

example of a negative comment is: "I know I sound bitter but nobody in my group was prepared to [do] any of the technical aspects so that fell to me."

On this matter, tutors' views were more united than those of students'. Eight out of the 10 tutors commented on whether they felt that the work was fairly distributed, and all 8 felt it was not. Tutors highlighted that one or two students (often the more technically confident ones) did more work than others.

There were also significant differences between the opinions of students and tutors on the fairness of marks, including the use of group marks. Again, students' comments were split between positive (18 comments from 16 students) and negative (14 comments from 8 students). Tutors, however, were more negative about this, with only one tutor saying they felt group marks were fair and 6 tutors commenting explicitly on the difficulties and frustrations of awarding the same group mark to all group members. Particular reference was made to the fact that the group marks do not reflect differences between students who make "minimal contribution" and yet enough to qualify for the group marks, and "the superstars who actually made the collaboration work."

The positive comments from students showed that they felt their individual input had been recognized and was reflected in the mark they received. Some of these comments, however, were more related to the fact that students were simply pleased with their mark, rather than being pleased that group marks were used. One student added that they found the inclusion of a group mark "odd" but he was nonetheless happy with his mark. Likewise, another said he would prefer no group mark element despite being pleased with his mark. Although some students expressed concern about the mark they personally received, and the effect the group had on this mark, others were more concerned about the marks others were receiving, and whether these were fair.

A small number of comments directly referred to worry and frustration about their own marks possibly being affected by others. For example: "Since we can't control or have any ownership of what other people are doing if we don't do their bits for them and they don't do them and we get marked down for it then that doesn't seem reasonable."

There were also concerns about what mark others were getting, and the transparency of the marking: "I would have liked to know whether or not these two people that did not contribute or decided to contribute later in the assignment got zero, because that was the condition of the marking scheme."

Finally, with respect to the assessment, nine out of 10 tutors discussed their experiences of marking the group project. All tutors that took part are experienced tutors who have marked assignments for many years; however, seven out of the nine said they found marking group work challenging, frustrating, or tedious. Only two of the nine did not find the marking of group work onerous. Marking was viewed as challenging largely because information needed to be drawn together from several sources (the website, the forums, the wiki) and collating and considering the different components was difficult. Another challenge was differentiating between students—and allocating marks fairly across a group—both at the high achieving and low achieving ends of the spectrum. One strategy identified separately by two tutors was to keep on top of the process from the start of the group project. One said it was important to keep on top of forum postings from the beginning in order to understand the composition of groups. Another created a spread sheet for recording salient contributions made by individual students and to make notes on group dynamics.

Discussion

In this section, the findings from the research are discussed in relation to the four research questions, and to the research literature presented above.

What Aspects of Online Group Projects do Students Find Enjoyable/Motivating/Rewarding?

Students valued the opportunity to work with other students. For distance learners this was an unusual experience and it made them feel less isolated. Most students enjoyed the experience of collaborating and interacting with their peers. They also appreciated that team working is relevant to the modern workplace, so the group project was an authentic experience in that respect. As other researchers have identified, authentic tasks and contexts are a key factor in successful online learning (Herrington et al, 2010; Lombardi, 2007; Amory, 2014).

Most students were pleased and proud when the website came together and looked impressive. This appeared to be a strong motivation for students—to produce something that looked good, and that they could share with others. Similarly, Lin & Reigeluth (2016) found that groups collaborating via wikis were "confident and excited when sharing their learning outcomes." Although the website task was challenging, both technically and in terms of the collaborative process, many students found this to be an added motivation. They gained a sense of achievement from overcoming the obstacles.

What Aspects of Online Group Projects do Students Find Difficult/Demotivating/Frustrating?

The most difficult aspect of the collaboration was coping with absent group members: those who disappeared partway through, did not meet deadlines, or generally did not pull their weight. Payne et al. (2006) identified these issues in group projects generally, and they are even more difficult to deal with in online group projects.

A related point was that students were generally working cooperatively, rather than collaboratively. According to Oliver et al. (2007), collaborative learning takes place when "students have a common goal, share responsibilities, are mutually dependent and need to reach agreement through open interactions." Sometimes, as observed here, group tasks end up being completed cooperatively, with tasks and responsibilities divided so that students work alongside each other, rather than working together (Smith et al., 2011).

Another problem was when there were personality clashes in the group, or when one person was very dominating. Conflict within a group can cause the group to fragment or members to drop out (McConnell, 2005; Ozturk & Hodgson, 2017). Findings by Smith et al. (2011) suggest that interpersonal problems may be more of a problem in online groups than in face-to-face ones. For some students, the prospect or experience of the collaboration caused anxiety. This is a worrying aspect to emerge from the research. If a group project causes less confident students to feel anxious—and thus to withdraw from the work—their assessment and progression will be affected.

The aspect of the group project that students found most frustrating, particularly students who were technically confident, was the cut-down version of the WordPress software. Students felt unable to make their website visually appealing, with features they thought would be present in a real scenario (e.g., social media links). In this respect they thought that the task they were set and the tool provided to accomplish it were not authentic. This finding highlights the importance of finding the right balance

between (1) structuring/controlling the task and tools and (2) providing enough autonomy to motivate students (Brindley et al., 2009). As a student commented in Thorpe and Edmunds (2011), if there is too much structure you "lose some of that learning experience … things you can apply to your own work context."

What are Tutors' Opinions on Online Group Projects, and What are Their Biggest Challenges?

A surprising finding from the research was that tutors were considerably more negative than students about having group marks. Many tutors considered that the group work was distributed very unevenly. This was particularly the case for tasks which were more technical: these often seemed to be left to the more technically confident students. Tutors therefore concluded that group marks are unfair (Roberts & McInnerney, 2007).

Most tutors found marking the group project difficult and time-consuming, mainly because information needed to be tracked, gathered, and integrated from several online spaces. As Lombardi (2007) points out, this is necessary for fair assessment. Although some tutors had developed strategies for this, it was nevertheless seen as tedious. Tutors also found it challenging to differentiate between students' contributions in a way that seemed fair. Again, this is consistent with previous research (Strauss et al. 2014).

What are the Key Aspects for Ensuring Fair and Effective Assessment of Online Group Work?

Assessment can be a strong motivator for engagement in online learning, but the assessment needs to be as fair as possible, from the perspectives of students and of tutors. As Huang (2002) points out, it is important to evaluate the learning process, and not just the end result. For a group project, this means that the process of collaboration as well as the product should be assessed. When students are collaborating via online tools it is possible to use the online records to assess their collaborative process; however, this is not easy to do, and it takes considerable time. Hopefully, in the future, tools and utilities can be developed to support tutors/markers in this endeavour. This could be a fruitful topic for future research, particularly given the increasing awareness of approaches based on "learning analytics" (Sclater, Peasgood, & Mullen, 2016).

A specific issue that was considered in this research was whether it is fair to have group marks: marks that are allocated equally to all participating members of the group. Prior research suggests that reliance on group marks is ill-advised (Roberts & McInnerny, 2007; Payne et al., 2006). The current research found that most of the students were not overly concerned about the group marks, although some thought they were potentially unfair; they would have liked to know whether non-contributing group members were actually awarded the group marks. Tutors were more adamant that the group marks were unfair because some group members contributed much more than others to the work. This suggests that, if group marks are used, they should be kept at a modest level as a proportion of a student's overall mark. The tutor comments suggest that allocating 40% of marks as group marks is too high. The authors agree and are considering removing the group marks altogether in future group projects that they design.

Conclusion

A limitation of the research is that it is based on a small, self-selected sample of students and tutors. It is possible that the students who participated in the research were those who were more engaged with the group work. The sample may therefore not be representative of the cohort as a whole. However, the research has provided rich, in-depth qualitative data illustrating these students' and tutors' perspectives. This will hopefully contribute to future improvement of online group projects, with corresponding increases in student achievement and satisfaction.

Although the online group project was challenging, the students' attitudes towards it on completion were generally favourable. Those that took part in this research appeared to understand the value of the activities they had undertaken, and found the experience rewarding. However, there were difficulties and frustrations caused by aspects of the collaboration and of the Web development software. Much of the frustration was caused by limitations imposed by the module team to make the task amenable to all levels of students.

The research findings highlight that a key requirement for successful online group projects is to motivate students to participate fully. If students engage with the activities, they generally find them enjoyable and rewarding. But if they fail to engage, there are significant difficulties for other students in the group. Related to these points, it is important to assess students' contributions fairly, taking into account their individual contributions to the collaborative process, as well as to the group product. Careful consideration also needs to be given to the balance between individual marks and group marks (if used).

One way to encourage participation is to make the project as authentic as possible. If the task set and the context used seem authentic, students will see that they can develop skills that are relevant to the workplace, and they will be encouraged to participate. A further motivating aspect would be enabling students to showcase the products they develop together. For a visual and interactive product such as a website, this would further enhance students' sense of achievement and pride.

References

Allan, J., & Lawless, N. (2003). Stress caused by on-line collaboration in e-learning: A developing model. *Education + Training*, *45*(8/9), 564–572. doi: 10.1108/00400910310508955

Amory, A. (2014). Tool-mediated authentic learning in an educational technology course: A designed-based innovation. *Interactive Learning Environments*, *22*(4), 497–513. doi: 10.1080/10494820.2012.682584

Brindley, J. E., Walti, C., & Blaschke, L.M. (2009). Creating effective collaborative learning groups in an online environment. *The International Review of Research in Open and Distributed Learning*, *10*(3). doi: 10.19173/irrodl.v10i3.675

Brown, J. S., Collins, A., & Duguid, P. (1989). Situated cognition and the culture of learning. *Educational Researcher*, *18*(1), 32–42. doi: 10.3102/0013189X018001032

Bryman, A. (2015). *Social research methods* (5th ed.). Oxford: Oxford University Press.

Donlan, L. (2014). Exploring the views of students on the use of Facebook in university teaching and learning. *Journal of Further and Higher Education, 38*(4), 572–588. doi: 10.1080/0309877X.2012.726973

Herrington, J., Reeves, T. C., & Oliver, R. (2010). *A guide to authentic elearning*. New York: Routledge.

Hrastinski, S. (2009). A theory of online learning as online participation. *Computers & Education, 52*, 78–82. doi: 10.1016/j.compedu.2008.06.009

Huang, H-M. (2002). Toward constructivism for adult learners in online learning environments. *British Journal of Educational Technology*, *33*(1), 27–37. doi: 10.1111/1467-8535.00236

Kear, K., Chetwynd, F., Williams, J., & Donelan, H. (2010). Web conferencing for synchronous online tutorials: Perspectives of tutors using a new medium. *Computers & Education*, *58*, 953-963. doi: 10.1016/j.compedu.2011.10.015

Kear, K., Donelan, H., & Williams, J. (2014). Using wikis for online group projects: student and tutor perspectives. *The International Review of Research in Open and Distributed Learning, 15*(4), 70-90. doi: 10.19173/irrodl.v15i4.1753

Lave, J., & Wenger, E. (1991). *Situated learning: Legitimate peripheral participation*. Cambridge, Cambridge University Press.

Lin, C.-Y., & Reigeluth, C. M. (2016). Scaffolding wiki-supported collaborative learning for small-group projects and whole-class collaborative knowledge building. *Journal of Computer Assisted Learning*, *32*(6), 529–547. doi: 10.1111/jcal.12140

Lombardi, M. M. (2007). *Authentic learning for the 21st century: An overview*. Educause Learning Initiative. Retrieved from https://library.educause.edu/resources/2007/1/authentic-learning-for-the-21st-century-an-overview

McConnell, D. (2005). Examining the dynamics of networked e-learning groups and communities. *Studies in Higher Education*, *30*(1), 25–42. doi: 10.1080/0307507052000307777

McConnell, D. (2006). *E-learning groups and communities*. Berkshire: Open University Press.

McGrath, J. E. (1990). Time matters in groups. In J. Galegher, R.E. Kraut, & C. Egido. (Eds.), *Intellectual teamwork: Social and technological foundations of cooperative work* (pp. 23–61). Hillsdale, NJ, USA: L. Erlbaum Associates Inc.

Myers, S. A., Bogdan, L. M., Eidsness, M. A., Johnson, A. N., Schoo, M. E., Smith, N. A., … & Zackery, B. A. (2009). Taking a trait approach to understanding college students' perceptions of group work. *College Student Journal*, *43*(3), 822–831.

Naismith, L., Lee, B. H., & Pilkington, R. M. (2011). Collaborative learning with a wiki: Differences in perceived usefulness in two contexts of use. *Journal of Computer Assisted Learning*, *27*, 228–242. doi: 10.1111/j.1365-2729.2010.00393.x

Oliveira, I., Tinoca, L., & Pereira, A. (2011). Online group work patterns: How to promote a successful collaboration. *Computers & Education, 57*, 1348–1357. doi: 10.1016/j.compedu.2011.01.017

Oliver, R., Herrington, A., Herrington, J., & Reeves, T. C. (2007). Representing authentic learning designs supporting the development of online communities of learners. *Journal of Learning Design*, *2*(2), 1–21. doi: 10.5204/jld.v2i2.36

Ozturk, T. H., & Hodgson, V. (2017). Developing a model of conflict in virtual learning communities in the context of a democratic pedagogy. *British Journal of Educational Technology*, *48*(1), 23–42. doi: 10.1111/bjet.12328

Payne, B. K., Monk-Turner, E., Smith, D., & Sumter, M. (2006). Improving group work: Voices of students. *Education*, *146*(3), 441–448.

Roberts, T. S. & McInnerney, J. M. (2007). Seven problems of online group learning (and their solutions). *Educational Technology & Society*, *10*(4), 257–268.

Sclater, N., Peasgood, A., & Mullen, J. (2016) *Learning analytics in higher education: A review of UK and international practice*. Retrieved from https://www.jisc.ac.uk/sites/default/files/learning-analytics-in-he-v3.pdf

Selwyn, N. (2009). Faceworking: Exploring students' education-related use of facebook. *Learning, Media and Technology, 34*(2), 157–174. doi: 10.1080/17439880902923622

Sfard, A. (1998). On two metaphors for learning and the dangers of choosing just one. *Educational Researcher, 27*(2), 4–13. doi: 0.3102/0013189X027002004

Smith, G. G., Sorensen, C., Gump, A., Heindel, A. J., Caris, M., & Martinez, C.D. (2011). Overcoming student resistance to group work: Online versus face-to-face. *Internet and Higher Education*, *14*, 121-128. doi: 10.1016/j.iheduc.2010.09.005

Strauss, P., U-Mackey, A., & Crothers, C. (2014). "They drag my marks down!"—Challenges faced by lecturers in the allocation of marks for multicultural group projects. *Intercultural education, 25*(3), 229–241. doi: 10.1080/14675986.2014.905361

Tess, P. A. (2013). The role of social media in higher education classes (real and virtual)—A literature review. *Computers in Human Behavior, 29*, A60–A68. doi: 10.1016/j.chb.2012.12.032

Thorpe, M., & Edmunds, R. (2011). Practices with technology: Learning at the boundary between study and work. *Journal of Computer Assisted Learning*, *27*, 385–398. doi: 10.1111/j.1365-2729.2010.00405.x

Webb, N. M. (1995). Group collaboration in assessment: Multiple objectives, processes, and outcomes. *Educational Evaluation and Policy Analysis, 17*(2), 239–261. doi: 10.3102/01623737017002239

UK Commission for Employment and Skills [CES]. (2016) *Employer skills survey 2015: UK results*. Retrieved from https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/525444/UKCESS_2015_Report_for_web__May.pdf

Universities UK. (2016) *Higher education in England: Provision, skills and graduates*. Retrieved from http://www.universitiesuk.ac.uk/policy-and-analysis/reports/Pages/higher-education-in-england-provision-skills-and-graduates.aspx